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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/539,929 | 03/31/2000 | Shigeru Yao | U-Wp-5525 Aoki | 2221 |

9629 7590 05/08/2002

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| EXAMINER |
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ROCHE, LEANNA M

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| ART UNIT | PAPER NUMBER |
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1771

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DATE MAILED: 05/08/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/539,929

Applicant(s)

YAO ET AL.

Examiner

Leanna Roche

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 January 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7, 10 and 12-15 is/are pending in the application.
- 4a) Of the above claim(s) 12-14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7, 10 and 15 is/are rejected.
- 7) ☒ Claim(s) 5, 10 and 15 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. The amendments filed January 25, 2002 have been entered and carefully considered. Claims 8, 9 and 11 have been cancelled. Claims 12-14 remain withdrawn from consideration. Claims 1-7, 10 and 15 remain pending in this application.

Claim Objections

2. Claims 10 and 15 are objected to because of the following informalities: Claim 10 depends from cancelled Claim 9. For the purposes of examination, Claim 10 has been read to depend from Claim 1. Appropriate correction is required.

3. Claim 5 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. As amended, Claim 1 teaches a "porous insulating film...having a porous structure in which fine continuous pores reach to both surfaces of the film". Claim 5 teaches "a porous insulating film...wherein the fine porous structure consists of fine continuous pores". It is the examiner's belief that because Claim 1 discloses a porous structure of fine continuous pores, Claim 5 does not further limit Claim 1.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-7 and 10 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Michaels (USPN 4450198) substantially as set forth in Paper No. 8, paragraphs 5.

7. Claims 1-7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tomioka et al. (USPN 5510395) in view of Michaels (USPN 4450198).

Tomioka discloses a fine porous film of a polyimide having excellent heat resistance and dynamic characteristics which may be used as an insulating film. The pore size of Tomioka, 0.05 to 10 μm (Column 9, line 66 - Column 10, line 1), reads on Applicant's mean pore size ranges. The porosity of Tomioka, 2 to 70% (Column 10, lines 30-31), reads on Applicant's claimed porosity ranges. The thickness of Tomioka is from 5 to 100 μm (Column 10, lines 31-32). The film of Tomioka is formed by casting. The dielectric constant of Tomioka ranges from 1.5 to 3.0. Tomioka discloses that the gas permeability of their film may range from almost zero to 7.0 $\text{cm}^3/\text{cm}^2 \cdot \text{sec} \cdot \text{cmHg}$ or

more. This reads on Applicant's claimed resistance to the passage of air. It is known in the art that polyimides have a heat resistance of greater than 200°C (USPN 6115514, Column 15, lines 34-35).

Tomioka does not specifically disclose a porous structure having fine continuous pores reaching to both surfaces of the film. However, Tomioka is directed to the production of a film with controllable gas permeability based on controllable porosity and pore size. Michaels discloses a housing made from a microporous polymeric material such as polyimide having pores interconnected through tortuous paths which extend from one surface of the housing to the other surface. Michaels teaches a device with regulated fluid flow based on variation in pore size. Therefore, it would have been obvious to the skilled artisan at the time this invention was made to combine the teachings of Tomioka and Michaels to produce a porous polyimide film having fine continuous pores reaching to both surfaces of the film, because both Michaels and Tomioka are directed to producing porous films with controlled permeability based on controlled pore size and porosity.

Tomioka does not specifically disclose the process limitation of a heat shrinkage of no greater than $\pm 1\%$. However, it appears that the porous polyimide film of Tomioka is substantially identical to the presently claimed porous insulating film, because both films are comprised of polyimide, have similar pore size ranges, have similar porosity ranges, have similar thickness ranges, and are formed by casting. Thus, it is believed by the examiner that the porous polyimide film of Tomioka would inherently possess a

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heat shrinkage of no greater than $\pm 1\%$. See *In re Best*, 195 USPQ 433 footnote 4 (CCPA 1977).

8. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tomioka et al. (USPN 5510395) in view of Michaels (USPN 4450198) as applied to claim 10 above, and further in view of Fujii et al. (USPN 4824743).

Neither Tomioka nor Michaels specifically disclose the use of their porous insulating film as a battery separator. Fujii is directed to an ion-exchange, porous, secondary battery separation membrane which may be comprised of a porous polyimide film (Column 1, lines 43-45). Therefore, it would have been obvious to the skilled artisan at the time this invention was made to produce a battery separator comprised of the porous polyimide film disclosed by Tomioka in view of Michaels, since it is known in the art that battery separators may be formed from porous polyimide membranes.

Response to Arguments

9. With regard to Michaels, Applicant states that the microporous polymeric material described by Michaels is used in combination with a swellable, hydrophilic polymer. Applicant contends that the amended claim language "consisting essentially of" limits the scope of claim 1 to a polyimide resin and other components "that do not materially affect the basic and novel characteristic(s) of the claimed invention." This argument is not found persuasive because on lines 61-64 of Column 5, Michaels states, "Wall 11, in

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an inventive embodiment, **also can be made** from microporous polymer whose pores are filled with a water permeable material that regulates the passage of water into the device." Therefore, only one embodiment of Michaels encompasses a microporous polymeric material in combination with a swellable, hydrophilic polymer. The microporous polymeric material of Michaels may consist solely of microporous polyimide (Column 5, lines 43-60), which would read on Applicant's claims.

10. Applicant also contends that Michaels teaches that the presence of low heat resistant, hydrophilic polymers is necessary to regulate the passage of fluids across the film, and therefore Michaels teaches a microporous film with overall low heat resistance because there is no motivation to choose to employ a microporous polymeric material in the absence of a swellable, hydrophilic polymer. However, as stated above, the microporous polymeric material of Michaels may consist solely of microporous polyimide (Column 5, lines 43-60) without the presence of swellable, hydrophilic polymer. Therefore, this argument is not found persuasive.

11. Applicant's arguments with respect to Burleigh (USPN 4613544) and JP 09100363 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

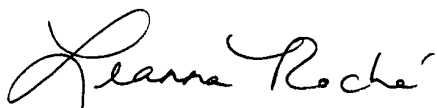
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leanna Roche whose telephone number is 703-308-6549. The examiner can normally be reached on Monday through Friday from 8:30 am to 6:00 pm (with alternate Mondays off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Blaine Copenheaver can be reached on 703-308-1261. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.



Imr
April 17, 2002



CHERYL A. JUSKA
PRIMARY EXAMINER